DOCUMENT RESUME

ED 346 963 PS 020 565

AUTHOR Moore, William P.
TITLE Achievement and Enrollment Evaluation of the Investigative Learning Magnet Elementary Schools, 1990-1991.
INSTITUTION Kansas City School District, Mo.
PUB DATE Oct 91
NOTE 37p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; Achievement Gains; Class Size; Cohort Analysis; Comparative Analysis; Elementary Education; *Elementary Schools; *Enrollment Trends; Extended School Day; Language Tests; Longitudinal Studies; *Magnet Schools; Mathematics Achievement; *Minority Groups; Reading Achievement; School Desegregation; Science Tests
IDENTIFIERS *Investigative Learning; *Kansas City Schools MO

ABSTRACT

Three schools in the Kansas City, Missouri, School District have operated for 5 years as Investigative Learning Magnet Schools (ILMS). The ILMS emphasize such student outcomes as inquiry, problem solving, critical thinking, and observation skills, and have a curricular focus on science, math, and computer skills. This report examines the ILMS' student achievement and enrollment during 5 years of operation under a court-ordered desegregation plan. Covering the period between 1986-87 and 1990-91, the report presents achievement gains or losses as measured by the Iowa Tests of Basic Skills (ITBS), Missouri Mastery and Achievement Test (MMAT), and Degrees of Reading Power Test (DRP). In addition, data on enrollments, racial composition, and extended-day participation are presented. Highlighted findings include the following: (1) ITBS achievement outcomes for students enrolled in the ILMS generally remained above national and district norms; (2) between 1986 and 1991, minority students showed gains of at least 5 percentile points in achievement scores in reading in kindergarten through third grade, while nonminority students showed gains in 2nd grade but losses in fourth and fifth grade; (3) nonminority student cohorts had consistently higher scores across years than minority student cohorts; (4) in comparison to students in traditional schools, ILMS students performed significantly better in reading, language, math, and science; and (5) the ILMS are close to court-ordered racial composition goals, with nonminority enrollment remaining relatively stable in the past 3 years. (AC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED346963

Achievement and Enrollment Evaluation of the Investigative Learning Magnet Elementary Schools

1990-1991

William P. Moore
Program Evaluator

October 1991

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Phyllis Clay
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Evaluation Office
Desegregation Planning Department
The School District of Kansas City, Missouri

PS 020565

 BEST COPY AVAILABLE

Table of Contents

Page

Introduction 1

Program Description 1

Evaluation Design 1

Results 2

ITBS Achievement 2

Reading 2

Language 5

Math 5

Science 5

ITBS Achievement Trends 5

Reading 5

Language 8

Math 8

Science 8

ILM Students Compared With Traditional School Students 15

MMAT Achievement 15

Enrollment Goals 18

Program capacity 18

Minority and non-minority enrollment 18

Class size 22

Extended day participation 22

Summary 22

Achievement 25

Table of Contents (continued)

Page

Enrollment 26

References 27

Acknowledgements 27

List of Tables

Table		Page
1A	ITBS Reading and Language Percentile Ranks	3
1B	ITBS Math and Science Percentile Ranks	4
2A	Summary Data for the 1990-1991 ITBS Language & Reading Tests for Investigative Learning Magnet and Randomly Selected Traditional Elementary Students	16
2B	Summary Data for the 1990-1991 ITBS Math & Science Tests for Investigative Learning Magnet and Randomly Selected Traditional Elementary Students	17
3	Missouri Mastery & Achievement Tests Average Scale Scores-Cook, Grade 3, Spring 1987, 1988, 1989, 1990, and 1991	18
4	Program Capacity and Enrollment 1990-1991	19
5	Minority & Non-Minority Enrollment by Grade and by Year	20
6	Extended Day Enrollment Figures	23

List of Figures

Figures Page

1A ITBS Reading Achievement Across Time: 1987 Kindergarten Cohort 6

1B ITBS Reading Achievement Across Time: 1988 Kindergarten Cohort 6

1C ITBS Reading Achievement Across Time: 1989 Kindergarten Cohort 7

2A ITBS Language Achievement Across Time: 1987 Kindergarten Cohort 9

2B ITBS Language Achievement Across Time: 1988 Kindergarten Cohort 9

2C ITBS Language Achievement Across Time: 1989 Kindergarten Cohort 10

3A ITBS Math Achievement Across Time: 1987 Kindergarten Cohort 11

3B ITBS Math Achievement Across Time: 1988 Kindergarten Cohort 11

3C ITBS Math Achievement Across Time: 1989 Kindergarten Cohort 12

4A ITBS Science Achievement Across Time: 1987 Kindergarten Cohort 13

4B ITBS Science Achievement Across Time: 1988 Kindergarten Cohort 13

4C ITBS Science Achievement Across Time: 1989 Kindergarten Cohort 14

5 Non-Minority Enrollment by Grade by Year 21

6 Extended Day Participation 24

ACHIEVEMENT AND ENROLLMENT EVALUATION OF THE INVESTIGATIVE LEARNING MAGNET ELEMENTARY SCHOOLS

1990 - 1991

Introduction

As specified in the *Long-Range Magnet School Plan* (Hale & Levine, 1986), evaluations of programs funded by the desegregation court order will occur in three year cycles. The first three years of program implementation will include two formative evaluations and conclude with a summative evaluation. The following three year cycle will include two years (four and five) of achievement and enrollment summaries and conclude with a summative evaluation in the sixth year. The Investigative Learning Magnet (ILM) schools have recently completed their fifth year. Following a brief discussion of the investigative learning program, and a description of the evaluation design, this report will present achievement and enrollment trends across the last five years at the Investigative Learning Magnet Schools.

Program Description

Three schools have been in operation for five years as Investigative Learning Magnet Schools (ILMS). Established as specified in the *Magnet School Plan* (Kansas City, Missouri School District, 1986), the ILMS are comprised of Hartman, serving kindergarten and first grade; Cook, serving second and third grades; and Marlborough, serving fourth and fifth grades.

The investigative learning magnet theme was implemented with an emphasis on such student outcomes as inquiry, problem solving and critical thinking, and observation skills (Kansas City, Missouri School District, 1986). Further, the *Magnet School Plan* stresses a curricular emphasis on science, math, and computer skills. Each of these areas are staffed by a full-time content teacher. Additional opportunities for learning enrichment in an extended day program, summer enrichment, and field trips are offered.

Evaluation Design

This report examines the Investigative Learning Magnet Schools achievement and enrollment during five years of operation under the court-ordered desegregation plan. Data for years 1986-1987

through 1990-1991 will be reported. The emphasis of this report will be on the effectiveness of the program in terms of achievement outcomes, as measured by the Iowa Tests of Basic Skills (ITBS), Missouri Mastery and Achievement Test (MMAT), Degrees of Reading Power Test (DRP), and enrollment, racial composition, and extended day participation data.

ITBS achievement performance for ILMS students will be compared statistically to a random sample of students from traditional elementary schools. These data will suggest achievement areas where ILMS students' performance differs from their district peers, as well as areas in which no differences in achievement performance exist.

Results

ITBS Achievement

Tables 1-A (reading and language arts) and 1-B (math and science) detail ITBS percentile ranks by grade level and minority status for students at ILM schools for the last six test administrations. Overall, it can be seen that for all grade levels and content areas tested in 1991, with the exception of fourth graders, ILM students achieved at or above district and national norms. Furthermore, with the exception of Marlborough fourth graders, the same can be said when minority and non-minority student performance was examined. More specifically, fourth grade sub-norm performance could be attributed to the performance of minority students who were below district and national norms in reading and mathematics. Additionally, fifth grade minority students scored below the national norm in reading. As such, minority and non-minority ITBS performance in 1991, excluding the above mentioned exceptions, was above district and national norms in reading, language, math, and science.

Grade level achievement across test administrations, beginning with baseline data (1986) did not indicate a clear pattern of achievement growth from year to year. However, when 1991 scores were compared to 1986 scores, changes of 5 or more percentile points were found.

Reading. For the reading test, kindergarten through third grade minority students had gains of at least 5 percentile points from 1986 to 1991 (see Table 1A). Minority students at the fourth and fifth grades did not have changes in reading exceeding five points. Similarly, non-minority performance did not vary by more than five percentile points in most grades. Non-minority growth occurred at the second grade. Alternately, declines of five or more points were found in the fourth and fifth grades. Kindergarten, first, and third grade scores did not vary substantially.

Table 1A
Investigative Learning Magnet Schools
ITBS Percentile Ranks

School / Grade / Ethnic	Reading								Language							
	1986	1987	1988	1989	1990	1991	Dist. 1991	Nat'l. Norm	1986	1987	1988	1989	1990	1991	Dist. 1991	Nat'l Norm
Hartman																
Kindergarten	60	78	84	83	83	---	---	---	47	65	74	68	70	71	61	50
Minority	---	---	75	78	80	---			---	---	59	56	60	61		
Non-Minority	---	---	91	89	88	---			---	---	88	82	83	83		
First	62	76	73	73	73	68	53	50	71	84	86	83	84	82	73	50
Minority	46	71	62	61	64	60			52	60	79	73	79	79		
Non-Minority	82	82	83	87	83	78			88	88	92	89	90	86		
Second	57	58	74	---	---	---	---	---	75	76	81	---	---	---	---	---
Minority	50	40	69	---	---	---			66	66	78	---	---	---		
Non-Minority	73	77	83	---	---	---			87	87	86	---	---	---		
Cook																
Second	---	---	--	68	69	71	50	50	---	---	---	78	77	76	64	50
Minority	---	---	---	55	53	55			---	---	---	70	66	67		
Non-Minority	---	---	---	82	86	86			---	---	---	85	86	85		
Third	59	58	50	57	65	67	44	50	56	69	50	69	71	69	57	50
Minority	46	48	35	51	50	56			47	61	47	66	63	62		
Non-Minority	82	68	73	67	82	81			71	75	75	72	80	78		
Fourth	62	45	53	---	---	---	---	---	64	57	62	---	---	---	---	---
Minority	53	32	48	---	---	---			59	49	58	---	---	---		
Non-Minority	76	61	61	---	---	---			71	66	68	---	---	---		
Marlborough																
Fourth	---	---	---	50	50	48	39	50	---	---	---	53	61	55	49	50
Minority	---	---	---	37	44	39			---	---	---	42	58	49		
Non-Minority	---	---	---	70	58	65			---	---	---	70	65	67		
Fifth	52	49	41	54	52	52	40	50	59	62	46	60	55	61	48	50
Minority	44	41	32	48	39	47			63	59	37	54	44	57		
Non-Minority	78	58	58	66	66	62			79	68	62	69	70	69		

Table 1B
Investigative Learning Magnet Schools
ITBS Percentile Ranks

School / Grade / Ethnic	Math								Science[1]					
	1986	1987	1988	1989	1990	1991	Dist. 1991	Natl. Norm	1988	1989	1990	1991	Dist. 1991	Natl. Norm
Hartman														
Kindergarten	56	74	74	74	75	80	64	50	---	---	---	---	---	---
Minority	---	---	56	62	66	68			---	---	---	---	---	---
Non-Minority	---	---	92	89	89	92			---	---	---	---	---	---
First	59	71	85	80	86	87	65	50	65	84	83	85	67	50
Minority	42	66	72	65	76	81			84	77	75	80		
Non-Minority	88	84	94	93	93	92			92	93	89	91		
Second	66	60	79	---	---	---	---	---	81	---	---	---	---	---
Minority	57	41	73	---	---	---			76	---	---	---		
Non-Minority	80	80	88	---	---	---			88	---	---	---		
Cook														
Second	---	---	---	80	77	81	64	50	---	75	80	82	58	50
Minority	---	---	---	67	63	68			---	63	72	74		
Non-Minority	---	---	---	92	90	92			---	87	89	89		
Third	57	59	53	67	74	74	48	50	53	70	74	83	59	50
Minority	43	51	39	61	59	62			37	64	63	74		
Non-Minority	78	67	74	90	89	88			74	78	85	90		
Fourth	64	50	54	---	---	---	---	---	62	---	---	---	---	---
Minority	62	42	54	---	---	---			57	---	---	---		
Non-Minority	81	67	68	---	---	---			67	---	---	---		
Marlborough														
Fourth	---	---	---	53	61	51	45	50	---	57	69	67	55	50
Minority	---	---	---	40	54	41			---	46	63	57		
Non-Minority	---	---	---	74	68	70			---	73	76	81		
Fifth	63	59	40	53	50	56	41	50	54	62	59	68	53	50
Minority	53	53	27	47	35	50			46	56	46	63		
Non-Minority	-81	65	60	63	69	65			67	70	73	76		

Language. For the language test, changes of 5 percentile points were not found at the second grade (see Table 1A). Minority students had growth greater than 5 points at the first and third grades. Conversely, a decline of 10 points was found at the fourth grade level. Kindergarten non-minority students had a five point decline and fifth grade non-minority students had a 10 point decline. Non-minority students at the third grade had a seven point achievement growth in language.

Math. Substantial growth was found for the math tests, primarily for minority students who had gains of at least 5 percentile points since 1986 at the kindergarten, first, second, and third grades (see Table 1B). Fourth grade minority students had a 21 point decline since 1986. Non-minority second and third grade students had increases of at least 5 percentile points since 1986. Conversely, fourth and fifth grade non-minority students had declines of at least 5 points since 1986.

Science. Kindergarten, first, and second grade students did not have substantial changes in science achievement since 1986 (see Table 1B). Alternately, third and fifth grade minority and non-minority students had gains of at least 5 percentile points. Similarly, fourth grade non-minority students had a gain of 14 percentile points since 1986 in science achievement.

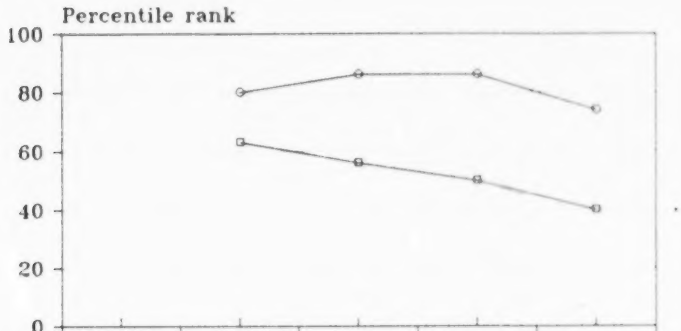
ITBS Achievement Trends

Since 1987 three kindergarten classes have completed at least three years of education in the Investigative Learning magnet program. Each class has been tracked from grade to grade to see if these classes differ in achievement levels, in part, as a function of exposure to the magnet program. This has resulted in three cohort groups who started in the ILMS as kindergarteners and have remained in the program for three or more years. Additionally, each class has been disaggregated into minority and non-minority groups. Interestingly, successive classes perform similarly across years.

Reading. When reading achievement was examined for the three classes, an interesting trend emerged (see Figures 1A, 1B, and 1C). Minority student performance in reading, for each cohort, has been declining since beginning the program as kindergarteners. However, with the exception of 1987 kindergartener's scores as fourth graders, achievement across years, for each minority cohort, has remained above the national norm. Conversely, while slight declines have been found, the trend for non-minority reading achievement has remained stable, with scores across years staying above the 80th percentile. The only exception was 1987 kindergartener's scores as fourth graders who scored at the 74th percentile. Furthermore, the achievement discrepancy found between minority and non-minority students in kindergarten, has widened by the time these students had been in the program at least three years.

Figure 1A

ITBS Reading Achievement Across Time: 1987 Kindergarten Cohort



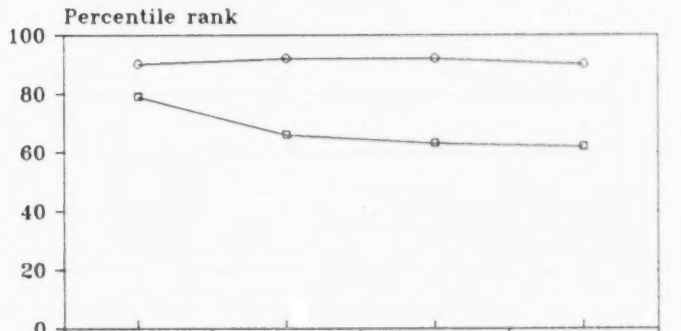
	Kindergrtn	First	Second	Third	Fourth
Minority	Not Avail.	63	56	50	40
Non-Minority	Not Avail.	80	86	86	74

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 1B

ITBS Reading Achievement Across Time: 1988 Kindergarten Cohort



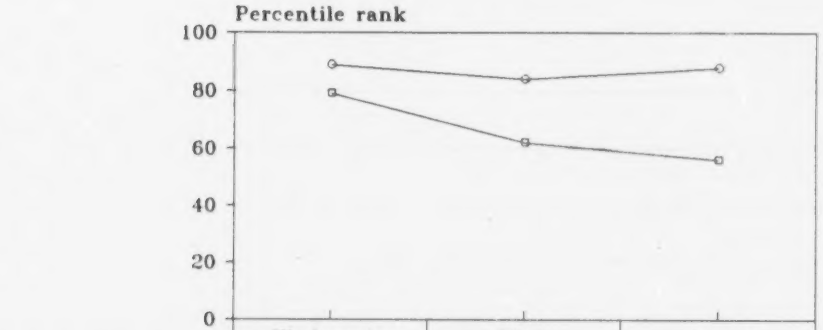
	Kindergrtn	First	Second	Third
Minority	79	66	63	62
Non-Minority	90	92	92	90

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 1C

ITBS Reading Achievement Across Time: 1989 Kindergarten Cohort



	Kindergrtn	First	Second
Minority	79	62	56
Non-Minority	89	84	88

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Language. While both minority and non-minority student cohorts, for each of the three kindergarten classes, have language achievement scores above the national norm in every year tested, both groups also have declining achievement across years (see Figures 2A, 2B, and 2C). After substantial gains for minority students and moderate gains for non-minority students in the first grade, scores have consistently declined for each cohort. Again, as found for reading achievement, non-minority students had scores typically above the 80th percentile while minority students had scores below the 80th percentile. The achievement discrepancy between minority and non-minority students when first tested appears to have widened for two of the three cohorts.

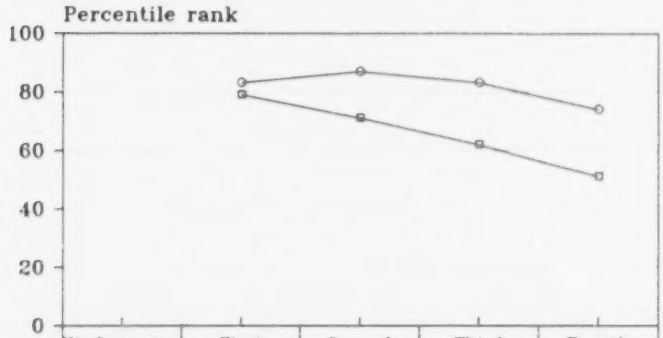
Math. Math achievement, for minority students, demonstrated a characteristic improvement from kindergarten to grade one and generally declining performance through the fourth grade (see Figures 3A, 3B, and 3C). An exception to this trend was found for the 1988 kindergarten cohort in the third grade where a slight increase from the second grade was found. In fact, as was seen for reading achievement, all three class cohorts, both minority and non-minority, perform at similar levels through the second grade. It should be noted that ILM students consistently score well above the district and national norms in math and both minority and non-minority students scored above the national norm each year. The only exception was 1987 minority kindergarteners as fourth graders. Non-minority student scores remained above the 80th percentile across years. Minority student performance generally remained between the 50th and 80th percentiles. The achievement discrepancy between minority and non-minority students has increased since students were first tested. Two of the three cohorts have a larger achievement discrepancy after three or four years in the program.

Science. Science achievement, measured initially in the first grade, was not tested in the district until 1988. Figures 4A, 4B, and 4C depict the performance of the minority and non-minority kindergarten class cohorts. Again, a similar pattern of cohort achievement exists.

With the exception of the 1989 kindergarten cohort, both minority and non-minority classes had a decline in science achievement scores from the first to second grade. After this decline, scores generally remained stable or slightly improved in the third and fourth grades. The only exception to this trend was found for 1987 minority kindergarten student scores in the fourth grade. First grade science achievement scores for minority and non-minority students were lower for the newest cohort (1989). In the second grade, the 1989 cohort appeared to be performing at a rate better than the 1987 cohort but slightly below the 1988 cohort. Minority science achievement has remained above the national norm every year tested, ranging from the 59th percentile to the 96th percentile. Similarly,

Figure 2A

ITBS Language Achievement
Across Time: 1987 Kindergarten Cohort



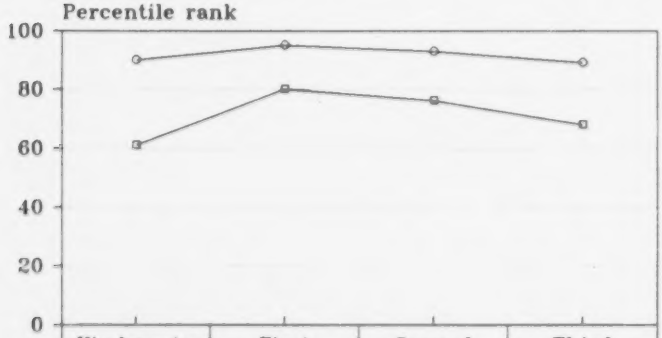
	Kindergarten	First	Second	Third	Fourth
Minority	Not Avail.	79	71	62	51
Non-Minority	Not Avail.	83	87	83	74

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 2B

ITBS Language Achievement
Across Time: 1988 Kindergarten Cohort



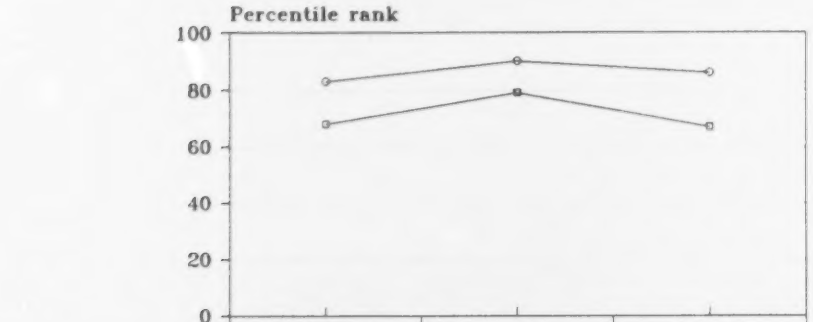
	Kindergrtn	First	Second	Third
Minority	61	80	76	68
Non-Minority	90	95	93	89

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 2C

ITBS Language Achievement Across Time: 1989 Kindergarten Cohort



	Kindergrtn	First	Second
Minority	68	79	67
Non-Minority	83	90	86

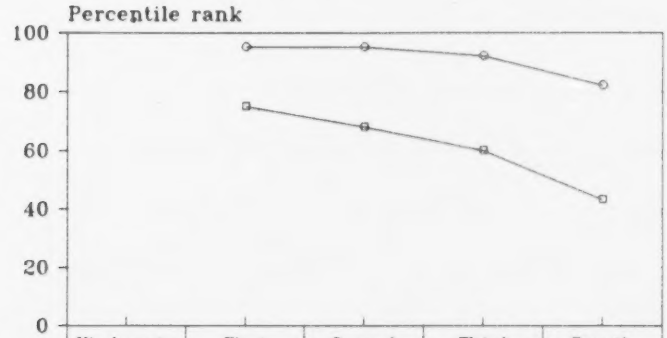
Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

BEST COPY AVAILABLE

Figure 3A

ITBS Math Achievement Across Time: 1987 Kindergarten Cohort



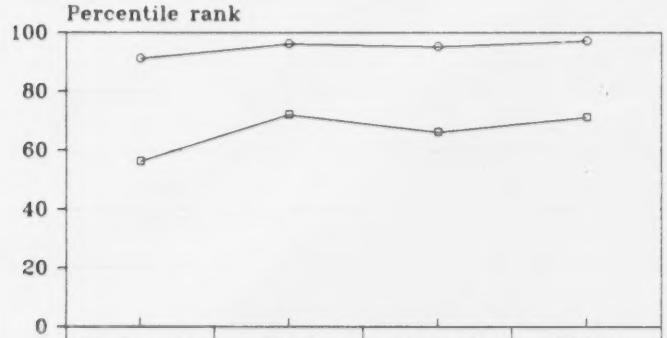
	Kindergrtn	First	Second	Third	Fourth
Minority	Not Avail.	75	68	60	43
Non-Minority	Not Avail.	95	95	92	82

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 3B

ITBS Math Achievement Across Time: 1988 Kindergarten Cohort



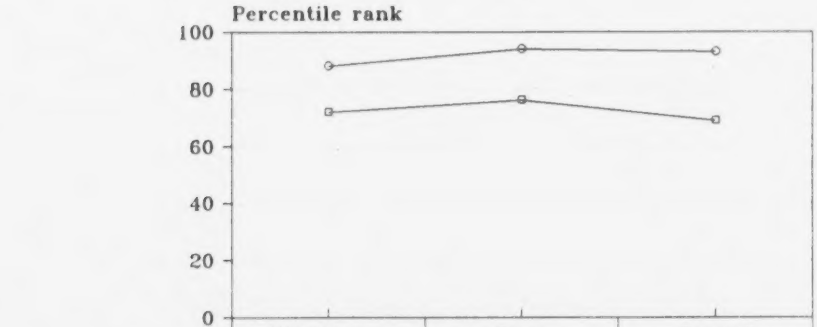
	Kindergrtn	First	Second	Third
Minority	56	72	66	71
Non-Minority	91	96	95	97

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 3C

ITBS Math Achievement Across Time: 1989 Kindergarten Cohort



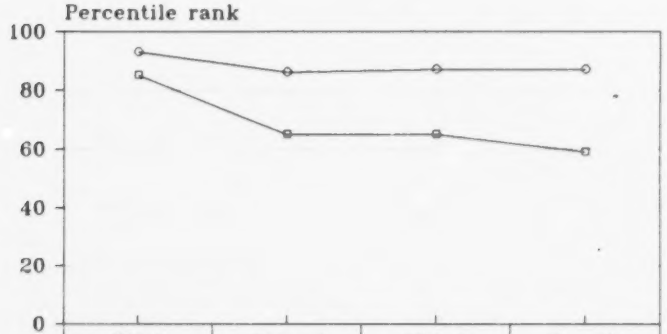
	Kindergrtn	First	Second
Minority	72	76	69
Non-Minority	88	94	93

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 4A

ITBS Science Achievement Across Time: 1987 Kindergarten Cohort



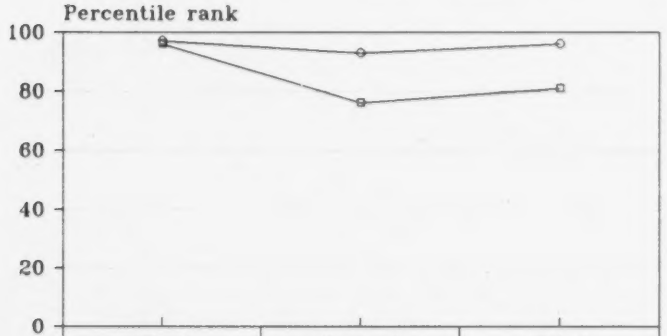
	First	Second	Third	Fourth
Minority	85	65	65	59
Non-Minority	93	86	87	87

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 4B

ITBS Science Achievement Across Time: 1988 Kindergarten Cohort



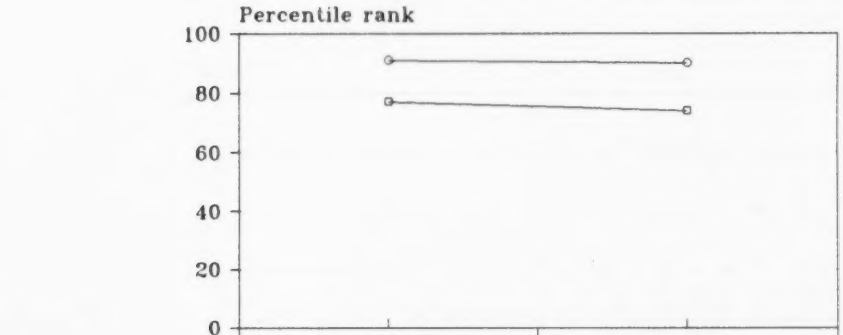
	First	Second	Third
Minority	96	76	81
Non-Minority	97	93	96

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

Figure 4C

ITBS Science Achievement Across Time: 1989 Kindergarten Cohort



	First	Second
Minority	77	74
Non-Minority	91	90

Grade

Note: Percentile ranks are based upon mean grade equivalent scores.

non-minority science achievement has remained above the 85th percentile across years and grades. The difference between minority and non-minority achievement in the first grade, for each of the three cohorts, was minimal. However, after four years in the program the 1987 minority and non-minority cohorts were further apart. A similar trend was found for the 1988 cohort. The 1989 cohort, with two scores (kindergarteners are not tested in science), appears to be slightly wider in the second grade, although no trend can be deduced from only two scores.

ILM Students Compared With Traditional School Students

In order to examine the achievement performance of ILM students when compared with traditional elementary school students, an analysis of covariance (ANCOVA) procedure was conducted to detect the presence of statistically significant differences in mean test scores. A random sample of traditional students at each grade level was drawn as a comparison group. ITBS grade equivalent scores were used as the dependent variable for the analyses. Mean grade equivalent scores were converted to percentile ranks for presentation in this report. ANCOVA requires the use of a covariate measure as a control feature. This variable adjusts the dependent variable (1991 ITBS achievement test score) for ability differences among students based on Cognitive Abilities Test scores. ANCOVA summary data can be found in Tables 2A (reading and language arts) and 2B (math and science).

Significant differences were found in each of the four content areas examined. Overwhelmingly, ILM students outperformed the comparison traditional school students. For the reading and science tests the ILM students, at each grade level, had significantly higher means than did the comparison students. For language achievement, ILM students had significantly higher means at the kindergarten, first, second, and fifth grades. No significant differences were found at the third and fourth grades. Analyses of math achievement found ILM students with significantly higher means at the kindergarten, first, second, third, and fifth grades. No significant differences were found at the fourth grade. In no content area or grade level examined did the traditional school sample significantly outperform the ILM students.

MMAT Achievement

Table 3 displays the results of the Missouri Mastery and Achievement Tests (MMAT) at Cook for third graders. At the elementary school level the MMAT is administered only to third graders. Data for the last five years are presented. As can be seen in Table 3, in language arts, math, and science the results indicated that ILM students scored above the district average in 1991. Scores are larger at each test administration, with the exception of 1990 and 1991 reading/language arts, and

Table 2A
Summary Data for the 1990-1991 ITBS Language & Reading Tests for Investigative Learning Magnet and Randomly Selected Traditional Elementary Students

Test Grade Means	ILMS Percentile Rank	Traditional Percentile Rank	Probability
Reading			
Grade 1			
Unadjusted mean	68*	42	.00
Grade 2			
Unadjusted mean	71*	38	.00
Grade 3			
Unadjusted mean	67	47	
Adjusted mean	65*	46	.00
Grade 4			
Unadjusted mean	48	39	
Adjusted mean	46*	40	.04
Grade 5			
Unadjusted mean	52	40	
Adjusted mean	53*	42	.00
Language			
Kindergarten			.00
Unadjusted mean	71*	48	
Grade 1			
Unadjusted mean	82*	61	.00
Grade 2			
Unadjusted mean	76*	51	.00
Grade 3			
Unadjusted mean	69	64	
Adjusted mean	69	64	.21
Grade 4			
Unadjusted mean	55	53	
Adjusted mean	54	53	.49
Grade 5			
Unadjusted mean	61	49	
Adjusted mean	60*	48	.00

Note: Analyses were done using grade equivalent scores. For presentation, these scores were converted to percentile ranks. When available, the cognitive abilities test (CoGAT) scores were used as a covariate. For kindergarten first and second grade students CoGAT scores were not available to use in an analysis of co variance. The adjusted mean represents a statistical estimate of the students performance on the 1991 posttest assuming that the students had identical ability means on the CoGAT. This adjusted mean is computed during the analysis of covariance procedure.

*=Difference at the $P \leq .05$ level of significance was found between the two groups on this test.

Table 2B
Summary Data for the 1990-1991 ITBS Math & Science
Tests for Investigative Learning Magnet and Randomly Selected
Traditional Elementary Students

Test Grade Means	ILMS Percentile Rank	Traditional Percentile Rank	Probability
Math			
Kindergarten			
Unadjusted mean	80*	51	.00
Grade 1			
Unadjusted mean	87*	52	.00
Grade 2			
Unadjusted mean	81*	46	.00
Grade 3			
Unadjusted mean	74	48	
Adjusted mean	72*	48	.00
Grade 4			
Unadjusted mean	51	49	
Adjusted mean	50	48	.589
Grade 5			
Unadjusted mean	56	45	
Adjusted mean	55*	46	.002
Science			
Grade 1			
Unadjusted mean	85*	50	.00
Grade 2			
Unadjusted mean	82*	37	.00
Grade 3			
Unadjusted mean	82	58	
Adjusted mean	80*	59	.00
Grade 4			
Unadjusted mean	67	53	
Adjusted mean	67*	53	.00
Grade 5			
Unadjusted mean	68	49	
Adjusted mean	67*	49	.00

Note: Analyses were done using grade equivalent scores. For presentation, these scores were converted to percentile ranks. When available, the cognitive abilities test (CoGAT) scores were used as a covariate. For kindergarten first and second grade students CoGAT scores were not available to use in an analysis of co variance. The adjusted mean represents a statistical estimate of the students performance on the 1991 posttest assuming that the students had identical ability means on the CoGAT. This adjusted mean is computed during the analysis of covariance procedure.

*=Difference at the $P \leq .05$ level of significance was found between the two groups on this test.

Table 3
Missouri Mastery & Achievement Tests
Average Scale Scores-Cook, Grade 3
Spring 1987, 1988, 1989, 1990, and 1991

Year	Reading/ Language Arts	Math	Science
1987	280	282	281
1988	296	292	294
1989	318	321	343
1990	302	324	345
1991	315	316	339
District 1991	274	289	290
State 1991	321	326	344

Note: Scores from 1988 and 1989 have been revised to correct errors in the State's scoring program.

1991 scores in math and science. In addition, the 1991 MMAT score in reading/language arts was 6 points below the state average. In math, the 1991 score was 10 points below the state average and in science the 1991 MMAT score was 5 points below the state average. Only in reading/language arts did the 1991 score exceed the 1990 score.

Enrollment Goals

The Federal court has specified minority/non-minority enrollment goals as a measure of the effectiveness of accomplishing desegregation reform efforts. Enrollment figures cited in this report were drawn from the student membership reports prepared by the district's Research Office. Figures are based on enrollment data reported on the fourth Wednesday in September.

Program capacity. According to figures released in the *September 26, 1990, Student Membership* (Research Office, 1990) report and the 1990-91 program capacity information utilized by the district's Admissions Office, actual student enrollment at Hartman and Cook was at 95% of capacity (see Table 4). Marlborough's actual enrollment was at 89% of capacity. Only Marlborough's fifth grade was below 90% capacity when grade level enrollments were examined. Actual student enrollment at Hartman was 392 students. At cook, 376 students were enrolled. Marlborough had 311 students enrolled in September.

Minority and non-minority enrollment. Table 5 and Figure 5 display enrollment and racial composition figures by grade level during five years of program functioning. During the 1986-1987 school year, racial composition expectations were set at 50% minority/50% non-minority. With the implementation of the successor to the *Magnet School Plan*, the *Long-Range Magnet School Plan*

Table 4
Investigative Learning Magnet Program
Program Capacity and Enrollment
1990-1991

School Grade	Program[1] Capacity	Actual[2]	Difference[3]	% of Capacity
Hartman				
Kindergarten	196	192	-4	98%
First	218	200	-18	92%
Total	414	392	-22	95%
Cook				
Second	198	191	-7	96%
Third	198	185	-13	93%
Total	396	376	-20	95%
Marlborough				
Fourth	166	154	-12	93%
Fifth	185	157	-28	85%
Total	351	311	-40	89%

[1] Program capacity utilized by the Admissions Office when placing students in magnet programs.
[2] From *September 26, 1990 Student Membership* (Research Office, 1990).
[3] "-" Indicates number of students below capacity. "+" indicates number of students above capacity

(Hale & Levine, 1986), the enrollment expectancies were set at 60% minority/40% non-minority. Clay (1989) writes:

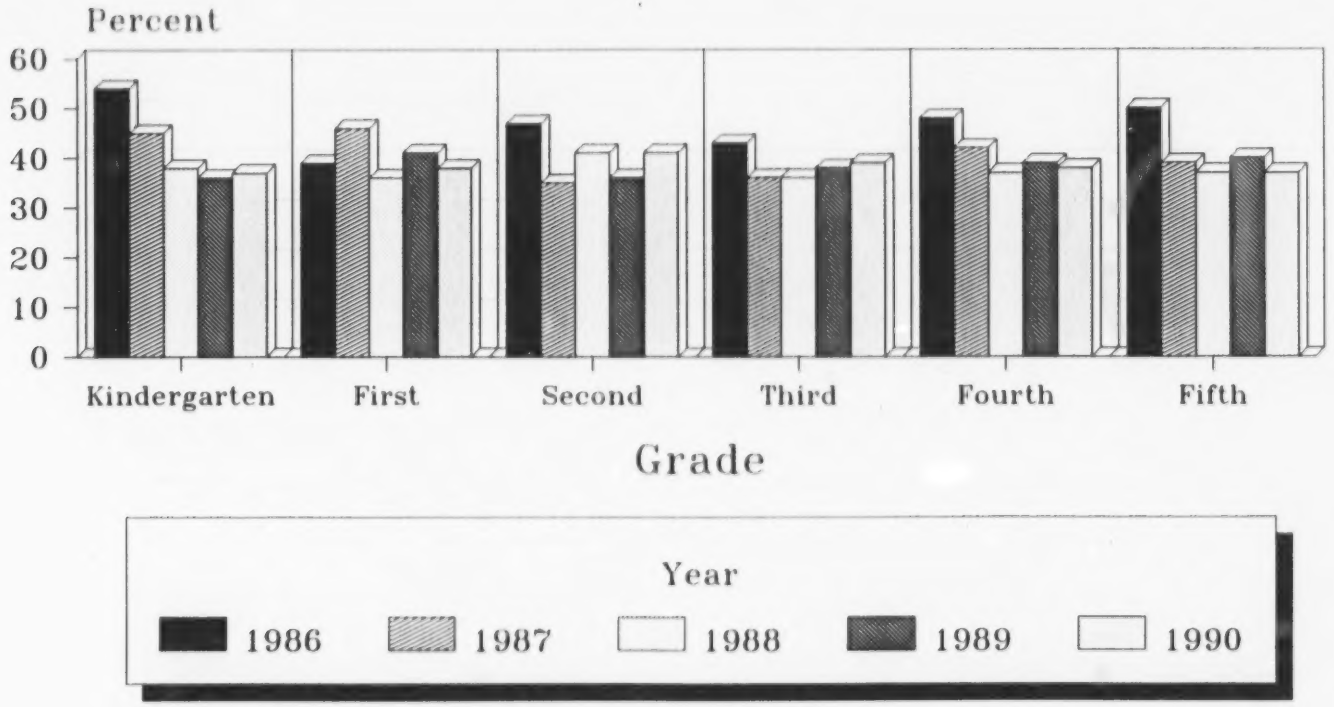
> Kindergarten and grade four moved toward the 60/40 minority/non-minority ratio in year two without exceeding the minority target of 60%. Grade five was nearly exactly on target with a 61/39 ratio during the second implementation year. Although grade one was at 61% minority in the first year, that grade lost minority population during the second year, moving below the 60% minority goal. Grades two and three increased minority population beyond the 60% minority goal in the second year. While none of the grades had exactly a 60-40 ratio in their fall 1988 membership, each of the grade levels were close . . . (p. 3).

Racial composition in 1990 indicated that all three schools achieved, or were close to meeting, enrollment expectations (see Table 5). Only for kindergarten and grade five were racial composition figures somewhat divergent from the other grade level enrollments (63%). Across time, as Figure 5 demonstrates, grade level non-minority enrollments, after leveling off in 1987, have remained

Figure 5

Investigative Learning Magnet Program

Non-Minority Enrollment by Grade by Year



Note: Percentages are rounded to the nearest whole percent

Table 5
Minority & Non-Minority Enrollment for the Investigative Learning Magnet Program by Grade and by Year
September 1987, 1988, 1989, & 1990

Schools / Grade	September 1987 Min. N	Sept 1987 Min. % of Total	September 1987 Non-Min. N	Sept 1987 Non-Min. % of Total	September 1988 Min. N	Sept 1988 Min. % of Total	September 1988 Non-Min. N	Sept 1988 Non-Min. % of Total	September 1989 Min. N	Sept 1989 Min. % of Total	September 1989 Non-Min. N	Sept 1989 Non-Min. % of Total	September 1990 Min. N	Sept 1990 Min. % of Total	September 1990 Non-Min. N	Sept 1990 Non-Min. % of Total
Hartman																
Grade K	79	55%	64	45%	141	62%	88	38%	133	64%	74	36%	120	63%	72	37%
Grade 1	89	54%	75	46%	141	64%	79	36%	123	59%	85	41%	124	62%	76	38%
Grade 2	95	65%	52	35%	----	----	----	----	----	----	----	----	---	----	----	----
Total	263	58%	191	42%	282	63%	167	37%	256	62%	159	38%	244	62%	148	38%
Cook																
Grade 2	----	----	----	----	110	59%	75	41%	121	64%	68	36%	112	59%	79	41%
Grade 3	112	64%	62	36%	117	64%	66	36%	109	62%	66	38%	112	61%	73	39%
Grade 4	99	58%	72	42%	----	----	----	----	----	----	----	----	---	----	---	----
Total	112	61%	134	39%	227	64%	141	38%	230	63%	134	37%	224	60%	152	40%
Marlborough																
Grade 4	----	----	----	----	105	63%	61	37%	99	61%	62	39%	95	62%	59	38%
Grade 5	89	61%	57	39%	102	63%	61	37%	94	60%	62	40%	99	63%	58	37%
Total[1]	----	----	----	----	207	62%	122	37%	193	61%	124	39%	194	62%	117	38%

Note: Percentages are rounded to the nearest whole percent.
Enrollment figures are from *A-By-School Comparison of Student Enrollment by Race & Grade for the Years 1986-87 & 1987-88* (Research Office, 1987); *September 28, 1988, Student Membership* (Research Office, 1988); *September 27, 1989, Student Membership* (Research Office, 1989); 1990 figures are from *September 26, 1990, Student Membership* (Research Office, 1990).

[1]Marlborough's school totals are not reported for years one and two since sixth grade enrollments are not included in the table.

relatively consistent. As Clay notes above, grade level enrollments, while none stand at exactly 60% minority/40% non-minority, from year to year have demonstrated the stability of the ILM schools in attracting and maintaining non-minority students.

Class size. The 1985 court order specified student class size guidelines for the elementary school classroom. The court order stipulated a maximum of 22 students in a classroom for kindergarten, first, second, and third grades, and a maximum of 27 students for grades four and five.

According to reports from school personnel, obtained through telephone interviews on May 1, 1991, all classrooms across the three schools were in compliance with the class size requirement. In fact, 32% of the kindergarten, first, second, and third grade classrooms had less than 22 students. Of the fourth and fifth grade classrooms, 92% had less than the maximum 27 students.

Extended day participation. An extended day program has been offered to students at each of the three ILM schools. Enrollment figures for the extended day program have been collected in the spring for the last three years of implementation and are reported in Table 6.

Initially, extended day participation has been variable across the three schools. An examination of session (e.g., A.M., P.M., Both A.M. and P.M.) enrollments across the three schools indicated that morning enrollments at Hartman and Marlborough have remained relatively unchanged in the last three years. Afternoon enrollments have, for the most part, remained unchanged or declined. Enrollment of students who attended both A.M. and P.M. sessions has typically increased or remained unchanged. As such, overall extended day participation, across three years, has been substantially different for the three schools (see Figure 6). In particular, Cook's extended day enrollment has been increasing annually. Alternately, Marlborough's enrollment has been declining.

A comparison of extended day racial composition (see Table 6) with total school enrollment (see Table 5) indicated that Hartman's extended day non-minority enrollment was 5% higher than that of the non-minority school population; Cook's extended day figures reflected a slightly lower non-minority percentage than did the school enrollment, and Marlborough's extended day figures indicated a slightly higher non-minority percentage than did the non-minority school-wide enrollment.

Summary

In brief, the achievement and enrollment evaluation has identified the following findings:

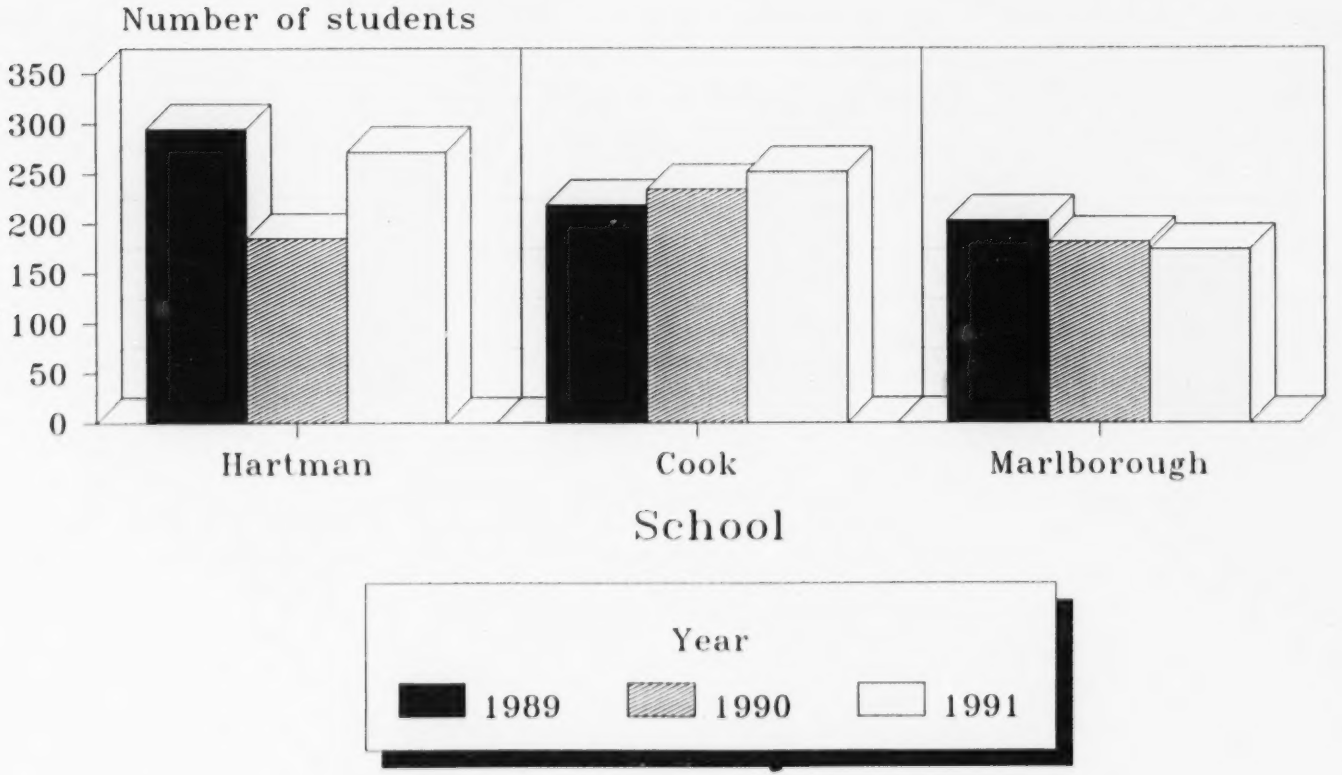
Table 6
Extended Day Enrollment Figures
Spring 1989, 1990, & 1991

Schools	Spring 1989			Spring 1990			Spring 1991		
Session	Min.	NM	Total	Min.	NM	Total	Min.	NM	Total
Hartman									
Morning Only	19	6	25	19	6	25	12	15	27
Afternoon Only[1]	100	60	160	40	20	60	55	44	99
Both A.M. & P.M.	61	49	110	61	49	110	88	58	146
Total	180	115	295	110	75	185	155	117	272
(%)	(61%)	(39%)		(62%)	(38%)		(57%)	(43%)	
Cook									
Morning Only	11	7	18	23	9	32	15	4	19
Afternoon Only	89	51	140	72	54	126	73	56	129
Both A.M. & P.M.	41	20	61	41	35	76	67	37	104
Total	141	78	219	136	98	234	155	97	252
(%)	(64%)	(36%)		(58%)	(42%)		(62%)	(38%)	
Marlborough									
Morning Only	7	3	10	6	5	11	5	5	10
Afternoon Only	117	43	160	94	46	140	74	52	126
Both A.M. & P.M.	28	5	33	22	8	30	23	15	38
Total	152	51	203	122	59	181	102	72	174
(%)	(75%)	(25%)		(67%)	(33%)		(59%)	(41%)	

Note: Percentages are rounded to the nearest whole percent.

[1]These numbers amended from the mid-year report to include children who participated in enrichment as well as collage activities. The percentages remain constant.

Figure 6
Extended Day Participation



Note: Figures were reported by school staff during the spring of each year.

Achievement

- ITBS achievement outcomes for students enrolled in the ILM schools during the last five years have generally remained above national and district norms for the ITBS.
- Achievement score gains or losses, from 1986 to 1991, exceeding 5 percentile points were found for the following tests:

1. Reading

   Minority: gains in kindergarten, first, second, third grades.
   Non-minority: gains in second grade. Losses in fourth and fifth grade.

2. Language

   Minority: gains in first and third grades. Loss in fourth grade.
   Non-minority: gains in third grade. Losses in kindergarten and fifth grade.

3. Math

   Minority: gains in kindergarten, first, second, third grades. Losses in fourth grade.
   Non-minority: gains in second and third grades. Losses in fourth and fifth grades.

4. Science

   Minority: gains in third and fifth grades.
   Non-minority: gains in third, fourth, and fifth grades.

Cohort trends suggested that non-minority students had consistently higher scores across years when compared to minority students.

- Minority achievement cohort trends indicated that ITBS performance has generally been declining in reading and language. Trends in math and science are less clear with some declines and some improvements found.
- Non-minority achievement cohort trends indicated that ITBS performance has remained relatively stable across years. While some decline has been found, the rate of decline is minimal in reading and language. Trends in math and science indicated that non-minority students are scoring high, relative to the national norm group, and scores have remained relatively unchanged during program implementation.
- Cohort achievement trends for minority and non-minority students, based on at least three years of data, do not appear to be converging. The achievement discrepancy between minority and non-minority students has not narrowed in reading, language (with the exception of the 1988 cohort), math (with the exception of the 1988 cohort), and science.

- Results of analyses of variance/covariance, with traditional students as a comparison group, indicated statistically significant differences between groups in favor of ILM students in the following achievement test skills:

  Reading (grades first through fifth),
  Language (grades kindergarten, first, second, and fifth),
  Math (grades kindergarten, first, second, third and fifth), and
  Science (grades first through fifth).

  No significant differences were found between ILM students and traditional school students in third grade language and fourth grade language and math.

- MMAT scores, while exceeding district averages and approaching state averages, have declined in 1991 from 1990. With the exception of 1990 and 1991 reading/language arts and math and science in 1991, scores from 1987 to the present have consistently improved with each annual administration. The declines found in 1991 deviate from the pattern of performance found during the last five years.

Enrollment

- Investigative Learning Magnets are close to court-ordered racial composition desegregation goals. Non-minority enrollment, after stabilizing in the first two years of program implementation, has remained relatively stable in the last three years. It is evident from the enrollment and desegregation results that the ILM program is providing a desegregated learning environment for its students.
- Program capacity information indicated that each of the three ILM schools were slightly under-enrolled. Alternately, each school had a grade level enrollment exceeding 90% of capacity. The only exception found was for Marlborough's fifth grade which had enrolled at 85% of capacity.
- Class size (pupil-to-teacher ratio) data indicated that, at each grade level, the ILM schools are observing the class size guidelines. Across schools, no classroom was found to have violated the court-ordered class size limit.
- Extended day participation at the ILM schools has been variable. Hartman, after a decline in participation in 1990 has had increased participation in 1991. Cook students have been attending the extended day program in increasing numbers annually. Alternately, Marlborough extended day participation has declined since 1989.

References

Clay, P.L. (1989). *Longitudinal Evaluation of the Science/Math Magnet Schools, Southwest Cluster Investigative Learning Magnets: 1986-1987, 1987-1988, 1988-1989.* Kansas City, MO: Kansas City, Missouri School District, Program Evaluation Office.

Hale, P.D. & Levine, D.U. (1986). *Long-Range Magnet School Plan.* Kansas City, MO: Kansas City, Missouri School District.

Kansas City, Missouri School District. (1986). *Magnet School Plan. Kansas City, MO: Kansas City, Missouri School District.*

Research Office (1987). *A By-School Comparison of Student Enrollment Race & Grade for the Years 1986-1987 and 1987-1988.* Kansas City, MO: Kansas City, Missouri School District.

Research Office (1990). *April 19, 1990 Elementary School Organization and Membership* Computer printout. Kansas City, MO: Kansas City, Missouri School District.

Research Office (1988). *September 28, 1988, Student Membership.* Kansas City, MO: Kansas City, Missouri School District.

Research Office (1989). *September 27, 1989, Student Membership.* Kansas City, MO: Kansas City, Missouri School District.

Research Office (1990). *September 26, 1990, Student Membership.* Kansas City, MO: Kansas City, Missouri School District.

Acknowledgements

The author would like to acknowledge the assistance of clerical assistant, Lois Wilkins, and part-time data collectors, Martin Chislom Jr. and Karl Welch. The scope of this evaluation would not have been possible without their clerical expertise, data collection, and data entry assistance.